IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of:		Docket No.:	TI-24317.1
	Xiaolin Lu, et al.	Art Unit:	TBD
Serial No.:	To be Assigned	Examiner:	TBD
Filed:	Herewith	Date:	April 26, 2001

For: MODEM HOST INTERFACE IN A DIGITAL SUBSCRIBER LINE TELECOMMUNICATIONS SYSTEM

Assistant Commissioner for
Patents
Washington, D.C. 20231

MAILING CERTIFICATE UNDER 37 C.F.R. §1.8(A)
I hereby certify that on April 26, 2001, this correspondence is being deposited with the U.S. Postal Service as First Class Mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231.

Ann Trent
Ann Trent

PRELIMINARY AMENDMENT

Dear Sir:

Prior to the examination of the above-identified application, please amend the application as follows:

IN THE SPECIFICATION:

Please replace the paragraph at page 1, lines 8 - 12, with the paragraph so identified in the accompanying Appendix B, including the changes shown in the marked up paragraph also so identified in the accompanying Appendix A. The amendments made to this paragraph are:

Page 1, line 8, replace "No._____" with --No. 09/000,899--.

Please replace the paragraph beginning Page 8, line 12, and ending Page 9, line 19, with the paragraph so identified in the accompanying Appendix B, including the changes shown in the marked up paragraph also so identified in the accompanying Appendix A. The amendments made to this paragraph are:

Page 9, line 9, substitute --O_{14}-- for "O_{12}", and substitute --C_{14}-- for "C_{12}".

Page 9, line 12, substitute --C_{12}-- for "C_{14}", and substitute --O_{12}-- for "O_{14}".

Please replace the paragraph at page 24, line 20 - page 25, line 12, with the paragraph so identified in the accompanying Appendix B, including the changes shown in the marked up paragraph also so identified in the accompanying Appendix A. The amendments made to this paragraph are:

Page 25, lines 10-11, replace "_____ (attorney docket number TI-25556)," with --Serial No. 09/000,599,--.

Please replace the paragraph at page 28, line 17 - page 29, line 24, with the paragraph so identified in the accompanying Appendix B, including the changes shown in the marked up paragraph also so identified in the accompanying Appendix A. The amendments made to this paragraph are:

Page 29, line 10, replace "Application _____ (attorney docket number TI-25481)" with --No. 6,104,749--.

Please replace the paragraph at Page 36, line 7 - line 24, with the paragraph so identified in the accompanying Appendix B, including the changes shown in the marked up paragraph also so identified in the accompanying Appendix A. The amendments made to this paragraph are:

Page 36, line 15, substitute --three-- for "two".

Page 36, line 18, substitute --three-- for "two".

IN THE CLAIMS:

Please cancel Claims 1 - 63.

Please add new Claims 64 - 75, as shown in the accompanying Appendix B.

REMARKS

Consideration of the above-identified Application, as amended herein, is respectfully requested. Claims 64 - 75 are in the case. Claims 1 - 63 have been canceled.

It is respectfully submitted that the claims recite the patentably distinguishing features of the invention, and that the present application is in proper form for allowance. Consideration of the application as amended herein, and allowance of the claims are requested at an early date.

While it is believed that the instant amendment places the application in condition for allowance, should the Examiner have any comments or suggestions, it is respectfully requested that the Examiner contact the undersigned in order to expeditiously resolve any outstanding issues.

Please charge any fees in connection with the filing of this paper, including extension of time fees to the Deposit Account No. 20-0668 of Texas Instruments Incorporated.

Respectfully submitted,

J. Dennis Moore
Attorney for Applicant(s)
Reg. No. 28,885

Texas Instruments Incorporated
P.O. Box 655474, MS 3999
Dallas, TX 75265
Phone: (972) 917-5646
Fax: (972) 917-4417/4418

Appendix A

VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Specification:

Paragraph at page 1, lines 8 - 12:

This application is related to U.S. Patent Application --No. 09/000,899-- [No. _____], entitled "Modem Device Driver In A Digital Subscriber Line Telecommunications System," (attorney docket TI-25556), filed on the same date as the present application, and having as its inventors Ms. Xiaolin Lu and Mr. Dennis Guy Mannering, and incorporated herein by this reference.

Paragraph beginning Page 8, line 12, and ending Page 9, line 19:

At a minimum for illustrating the preferred embodiments, each of the central office and remote location houses a computer 12 and 14, respectively. Computers 12 and 14 may be of any type of known computer configurations and, indeed, the type of computing device at the remote location may well differ from the type or configuration of that used at the central office (e.g., a rack system). Typically, therefore, a user of either computer may provide input to a corresponding computer, such as by way of a keyboard K and a mouse MS or other input or pointing device as known in the art. To simplify the present illustration, note for purposes of Figure 1 that each of the reference identifiers for these items (i.e., K and MS) as well as for other items discussed below further includes a subscript reciting the reference number of the corresponding computer. For example, computer 12 includes keyboard K_{12} and mouse MS_{12}. Continuing with this convention and looking to other attributes of computers 12 and 14, each computer preferably includes some device for presenting output to a user, such as a display D in the case of Figure 1. Internally to each computer may be various circuits including those mounted on circuit boards and/or cards, including a motherboard (shown in phantom) which includes a memory MEM, a central processing unit CPU or more than one such CPU as may likely be the case for host

computer 12, and likely other circuitry (not shown). Of particular note to the present embodiments, also included preferably internal to each computer and, thus, shown in phantom, is a modem M so that each of computers 12 and 14 may communicate with one another over a standard telephone company distribution system. In the case of host computer 12, note that it is likely to actually include and support multiple modems, although only one is shown to simplify the illustration as well as the following discussion. Looking to the distribution system along which the modems communicate, it includes twisted conductor pairs accessible for a connection between computers 12 and 14. In this regard, modem M_{14} of computer 14 provides an output which is provided to a standard telephone or other applicable connector and, thus, is connected to a telephone wall outlet $\underline{O_{14}}$ [O_{12}] via a standard telephone communication cable $\underline{C_{14}}$ [C_{12}]. This connection permits communication from modem M_{14} over the telephone company distribution system and, therefore, with modem M_{12} of computer 12. Note that while comparable connections using cable $\underline{C_{12}}$ [C_{14}] and outlet $\underline{O_{12}}$ [O_{14}] are shown at the telephone company, more typical industrial type connections may actually exist at that end of the connection. Lastly, given the communications of modems M_{12} and M_{14} with one another, note that in the preferred embodiment such communications are by way of a DSL category referred to as Medium-bit-rate Digital Subscriber Line (MDSL) technology, which currently contemplates downstream communications up to 2.8 Mbps and upstream communications up to 768 Kbps. One skilled in the art, however, will appreciate that many of the present teachings also provides aspects and benefits which may be implemented in other DSL categories.

Paragraph at page 24, line 20 - page 25, line 12:

With respect to the compatibility of contemporary computer applications programs directed to calling procedures and the modem dial up mode of the preferred embodiment, note that these type of programs typically interface with a part of a host computer's operating system which is based on the Telephony Application Programming Interface (TAPI). As is known in the art, TAPI is a software layer which is based on the connection

requirements of existing telephone systems. Thus, the TAPI interface anticipates that various events occur to establish a dial up connection. However, as noted earlier, the communication between modems M_{14} and M_{12} is message based rather than following the standard dial up procedures typically required by the telephone system. Nevertheless, the modem dial up mode of the preferred embodiment is operable to interact with the TAPI layer to accomplish a message-caused connection between modems M_{14} and M_{12}, but to render the appearance to the TAPI layer that the prior art dial up procedures were followed when, in fact, such procedures were not since they are not required for a modem-to-modem connection under the preferred embodiment. Thus, this compatibility also serves as an example of how the modem dial up mode of the preferred embodiment is related to the standard dial up mode used in contemporary computer applications programs and, therefore, is another attribute demonstrating why the mode of the preferred embodiment is referred to as a modem dial up mode of communication. Lastly in this regard, note that the compliance of the modem dial up mode with TAPI is further explored in the above-incorporated U.S. Patent Application --Serial No. 09/000,599-- [_____ (attorney docket number TI-25556)], entitled "Modem Device Driver In A Digital Subscriber Line Telecommunications System."

Paragraph at page 28, line 17 - page 29, line 24:

The framing and signaling protocol aspects of the LineConfigure command are operable to specify, as their names suggest, desired protocols which will govern subsequent communications between modems M_{12} and M_{14}. As known in the art, a protocol is generally a formal description of frame formats and the rules to be used by machines when communicating those frames. In the present embodiment, the framing protocol indicated in the LineConfigure command specifies the desired framing of DSL user data packets communicated between modems M_{12} and M_{14}, while the signaling protocol indicated in the LineConfigure command specifies the desired format of system data signals communicated between modems M_{12} and M_{14}. To further appreciate the protocol aspects of the

LineConfigure command, note first by way of contrast that under current prior art DSL technologies it is known for a vendor to build its modem hardware as dedicated to a single framing protocol and a single signaling protocol. Indeed, this is an example, as introduced in the Background Of The Invention section of this document, of a type of limitation of the prior art. As an alternative to this prior art approach, under the preferred embodiment both the framing protocol and the signaling protocol aspect of the LineConfigure command provides greater software flexibility by contemplating that a given modem may be configured to communicate using more than one type of protocol for both frame information and signal information. For the example of Figure 2 and with respect to framing protocols, therefore, the DSPs could have access to suitable software programming to choose between multiple framing protocols. For example, for the preferred embodiment it is contemplated that the most common framing protocol implemented by each of modems M_{12} and M_{14} will be a technique being developed by Texas Instruments Incorporated. This technique may be further appreciated by reviewing U.S. Patent --No. 6,104,749-- [Application _____ (attorney docket number TI-25481)], entitled "Message Frame And Flow Control In A Digital Subscriber Line", having as its inventors Ms. Xiaolin Lu and Mr. Dennis G. Mannering, filed on the same date as the current patent application, and which is hereby incorporated herein by reference. Additionally, the framing protocol feature of the LineConfigure command permits a request by a host computer to its corresponding modem to perform framing using an alternative protocol. For example, an alternative protocol may be the known point-to-point protocol ("PPP"). Other examples will be ascertainable by one skilled in the art. Moreover, this same flexibility also applies to the signaling protocol. Lastly, note in the preferred embodiment that up to four different framing protocols and up to four different signaling protocols may be selected. Thus, in the preferred embodiment again a parameter is sent with the LineConfigure command whereby the state of one set of two bits in that parameter may be adjusted (i.e., $2^2=4$) to select from any one of the four different framing protocols, and the state of the other set of two bits in that parameter may be adjusted to select from any one of the four different signaling protocols.

Paragraph, Page 36, line 7 - line 24:

In the case where the CRM is granted, modem M_{12} issues a connection answer message ("CAM") back to the "calling" modem M_{14}, where the CAM by definition indicates a grant of the requested connection. In response, modem M_{14} performs two operations. One of these two operations is to set the ring-back bit in its software, which thereafter may be loaded to its command/status register 30 in response to a command from host computer 14. This indication presents a compatible indication for the TAPI layer in host computer 14. Another of these two operations is to send an acknowledgment back to the granting modem M_{12}. After these two operations, modem M_{14} performs three additional operations. One of these three [two] operations is to set the connection bit in its software to connected, and again this software maintained bit thereafter may be loaded to its command/status register 30 in response to a command from host computer 14. Another of these three [two] operations is to issue an interrupt to its ISA bus via its interrupt generator 34. A third operation modem M_{14} performs is to set an interrupt code in its command/status register 30 which indicates that the interrupt was generated because a connection has been established. Thus, from this point until the connection is disconnected, a link layer connection has been formed between those modems and, therefore, by definition, those modems may communicate DSL user data between one another.

In the Claims:

Please cancel Claims 1 - 63.

Appendix B

PARAGRAPHS AND CLAIMS IN CLEAN FORM

In the Specification:

Paragraph at page 1, lines 8 - 12:

This application is related to U.S. Patent Application No. 09/000,899, entitled "Modem Device Driver In A Digital Subscriber Line Telecommunications System," (attorney docket TI-25556), filed on the same date as the present application, and having as its inventors Ms. Xiaolin Lu and Mr. Dennis Guy Mannering, and incorporated herein by this reference.

Paragraph beginning Page 8, line 12, and ending Page 9, line 19:

At a minimum for illustrating the preferred embodiments, each of the central office and remote location houses a computer 12 and 14, respectively. Computers 12 and 14 may be of any type of known computer configurations and, indeed, the type of computing device at the remote location may well differ from the type or configuration of that used at the central office (e.g., a rack system). Typically, therefore, a user of either computer may provide input to a corresponding computer, such as by way of a keyboard K and a mouse MS or other input or pointing device as known in the art. To simplify the present illustration, note for purposes of Figure 1 that each of the reference identifiers for these items (i.e., K and MS) as well as for other items discussed below further includes a subscript reciting the reference number of the corresponding computer. For example, computer 12 includes keyboard K_{12} and mouse MS_{12}. Continuing with this convention and looking to other attributes of computers 12 and 14, each computer preferably includes some device for presenting output to a user, such as a display D in the case of Figure 1. Internally to each computer may be various circuits including those mounted on circuit boards and/or cards, including a motherboard (shown in phantom) which includes a memory MEM, a central

processing unit CPU or more than one such CPU as may likely be the case for host computer 12, and likely other circuitry (not shown). Of particular note to the present embodiments, also included preferably internal to each computer and, thus, shown in phantom, is a modem M so that each of computers 12 and 14 may communicate with one another over a standard telephone company distribution system. In the case of host computer 12, note that it is likely to actually include and support multiple modems, although only one is shown to simplify the illustration as well as the following discussion. Looking to the distribution system along which the modems communicate, it includes twisted conductor pairs accessible for a connection between computers 12 and 14. In this regard, modem M_{14} of computer 14 provides an output which is provided to a standard telephone or other applicable connector and, thus, is connected to a telephone wall outlet O_{14} via a standard telephone communication cable C_{14} This connection permits communication from modem M_{14} over the telephone company distribution system and, therefore, with modem M_{12} of computer 12. Note that while comparable connections using cable C_{12} and outlet O_{12} are shown at the telephone company, more typical industrial type connections may actually exist at that end of the connection. Lastly, given the communications of modems M_{12} and M_{14} with one another, note that in the preferred embodiment such communications are by way of a DSL category referred to as Medium-bit-rate Digital Subscriber Line (MDSL) technology, which currently contemplates downstream communications up to 2.8 Mbps and upstream communications up to 768 Kbps. One skilled in the art, however, will appreciate that many of the present teachings also provides aspects and benefits which may be implemented in other DSL categories.

Paragraph at page 24, line 20 - page 25, line 12:

With respect to the compatibility of contemporary computer applications programs directed to calling procedures and the modem dial up mode of the preferred embodiment, note that these type of programs typically interface with a part of a host computer's operating system which is based on the Telephony Application Programming Interface

(TAPI). As is known in the art, TAPI is a software layer which is based on the connection requirements of existing telephone systems. Thus, the TAPI interface anticipates that various events occur to establish a dial up connection. However, as noted earlier, the communication between modems M_{14} and M_{12} is message based rather than following the standard dial up procedures typically required by the telephone system. Nevertheless, the modem dial up mode of the preferred embodiment is operable to interact with the TAPI layer to accomplish a message-caused connection between modems M_{14} and M_{12}, but to render the appearance to the TAPI layer that the prior art dial up procedures were followed when, in fact, such procedures were not since they are not required for a modem-to-modem connection under the preferred embodiment. Thus, this compatibility also serves as an example of how the modem dial up mode of the preferred embodiment is related to the standard dial up mode used in contemporary computer applications programs and, therefore, is another attribute demonstrating why the mode of the preferred embodiment is referred to as a modem dial up mode of communication. Lastly in this regard, note that the compliance of the modem dial up mode with TAPI is further explored in the above-incorporated U.S. Patent Application Serial No. 09/000,599, entitled "Modem Device Driver In A Digital Subscriber Line Telecommunications System."

Paragraph at page 28, line 17 - page 29, line 24:

The framing and signaling protocol aspects of the LineConfigure command are operable to specify, as their names suggest, desired protocols which will govern subsequent communications between modems M_{12} and M_{14}. As known in the art, a protocol is generally a formal description of frame formats and the rules to be used by machines when communicating those frames. In the present embodiment, the framing protocol indicated in the LineConfigure command specifies the desired framing of DSL user data packets communicated between modems M_{12} and M_{14}, while the signaling protocol indicated in the LineConfigure command specifies the desired format of system data signals communicated between modems M_{12} and M_{14}. To further appreciate the protocol aspects of the

LineConfigure command, note first by way of contrast that under current prior art DSL technologies it is known for a vendor to build its modem hardware as dedicated to a single framing protocol and a single signaling protocol. Indeed, this is an example, as introduced in the Background Of The Invention section of this document, of a type of limitation of the prior art. As an alternative to this prior art approach, under the preferred embodiment both the framing protocol and the signaling protocol aspect of the LineConfigure command provides greater software flexibility by contemplating that a given modem may be configured to communicate using more than one type of protocol for both frame information and signal information. For the example of Figure 2 and with respect to framing protocols, therefore, the DSPs could have access to suitable software programming to choose between multiple framing protocols. For example, for the preferred embodiment it is contemplated that the most common framing protocol implemented by each of modems M_{12} and M_{14} will be a technique being developed by Texas Instruments Incorporated. This technique may be further appreciated by reviewing U.S. Patent No. 6,104,749, entitled "Message Frame And Flow Control In A Digital Subscriber Line", having as its inventors Ms. Xiaolin Lu and Mr. Dennis G. Mannering, filed on the same date as the current patent application, and which is hereby incorporated herein by reference. Additionally, the framing protocol feature of the LineConfigure command permits a request by a host computer to its corresponding modem to perform framing using an alternative protocol. For example, an alternative protocol may be the known point-to-point protocol ("PPP"). Other examples will be ascertainable by one skilled in the art. Moreover, this same flexibility also applies to the signaling protocol. Lastly, note in the preferred embodiment that up to four different framing protocols and up to four different signaling protocols may be selected. Thus, in the preferred embodiment again a parameter is sent with the LineConfigure command whereby the state of one set of two bits in that parameter may be adjusted (i.e., $2^2=4$) to select from any one of the four different framing protocols, and the state of the other set of two bits in that parameter may be adjusted to select from any one of the four different signaling protocols.

Paragraph, Page 36, line 7 - line 24:

In the case where the CRM is granted, modem M_{12} issues a connection answer message ("CAM") back to the "calling" modem M_{14}, where the CAM by definition indicates a grant of the requested connection. In response, modem M_{14} performs two operations. One of these two operations is to set the ring-back bit in its software, which thereafter may be loaded to its command/status register 30 in response to a command from host computer 14. This indication presents a compatible indication for the TAPI layer in host computer 14. Another of these two operations is to send an acknowledgment back to the granting modem M_{12}. After these two operations, modem M_{14} performs three additional operations. One of these three operations is to set the connection bit in its software to connected, and again this software maintained bit thereafter may be loaded to its command/status register 30 in response to a command from host computer 14. Another of these three operations is to issue an interrupt to its ISA bus via its interrupt generator 34. A third operation modem M_{14} performs is to set an interrupt code in its command/status register 30 which indicates that the interrupt was generated because a connection has been established. Thus, from this point until the connection is disconnected, a link layer connection has been formed between those modems and, therefore, by definition, those modems may communicate DSL user data between one another.

In the Claims:

Please add the following new Claims 64 - 75:

64. A communications system comprising:

a computer, comprising

a memory operable to store a computer program,

a processor operable to execute said computer program, and

control means for issuing a command in response to the computer program, the command including a request to configure a line for communication in accordance with a plurality of line attributes; and

a first modem coupled to the control means for receiving the command and for negotiating with a second modem for grant of the line attributes;

wherein a first of the plurality of line attributes is a communications mode.

65. A computer system according to Claim 64 wherein said communications mode is one of a leased line mode and a modem dial up mode.

66. A computer system according to Claim 64 wherein a second of the plurality of line attributes is a framing protocol.

67. A computer system according to Claim 66 wherein the framing protocol is one of a plurality of protocols including point-to-point protocol.

68. A computer system according to Claim 64 wherein a second of the plurality of line attributes is a signaling protocol.

69. A computer system according to Claim 64 wherein a second of the plurality of line attributes is a speed definition.

70. A computer system according to Claim 69 wherein the speed definition specifies one of a plurality of selectable rates of data transfer.

71. A computer system according to Claim 64 wherein a second of the plurality of line attributes is a quality of service.

72. A communications system comprising:

a computer, comprising

a memory operable to store a computer program,

a processor operable to execute said computer program, and

control means for issuing a command in response to the computer program, the command including a request to configure a line for communication in accordance with a plurality of line attributes; and

a first modem coupled to the control means for receiving the command and for negotiating with a second modem for grant of the line attributes;

wherein a first of the plurality of line attributes is a quality of service.

73. A computer system according to Claim 72 wherein the quality of service is specified by a priority for the requested communication.

74. A computer system according to Claim 72 wherein the quality of service is specified by a variability in bit rate for the requested communication

75. A computer system according to Claim 74 wherein the variability in bit rate is specified as one of a constant bit rate and a variable bit rate.